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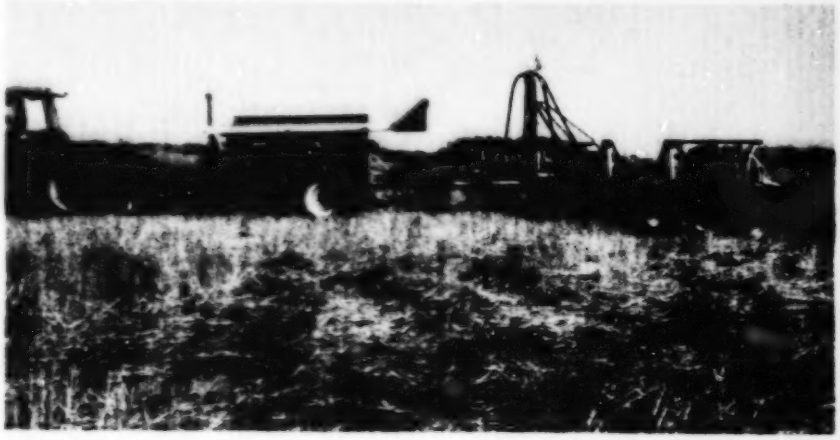
FarmFacts

Produced by Saskatchewan Agriculture and Food and Saskatchewan Rural Development

Why the Interest?

Low grain prices in relation to the cost of production resulted in producers searching for methods to reduce inputs and tillage operations but still maintain economic yields. Producers in Saskatchewan have shown interest in seed placement of nitrogen as an option to broadcasting or banding. Also, the introduction of new seeding equipment such as air-seeders can make it more convenient to apply fertilizer at seeding time.



Seed Placement Recommendations

Seed row placement of nitrogen fertilizer is one of the most effective means of applying nitrogen fertilizer for spring seeded cereal crops, provided damage to young seedlings is prevented.

The general recommendations for seed placed nitrogen applied in row spacings of 6-7" are given below:

A. Cereals:

Up to 40 lbs N/ac as ammonium nitrate (i.e. 34-0-0(0) can be applied with the seed of cereals. Not more than 25 lbs N/ac in the urea (i.e. 46-0-0) form should be seed placed. On sandy or Grey Wooded soils and with dry seedbed conditions, seed placed rates should be reduced to 25 lbs N/ac as ammonium nitrate or 15 lbs N/ac as urea. The total amount of fertilizer material placed with the seed should not exceed 170 lbs/ac.

DO NOT MIX GRANULAR UREA AND AMMONIUM NITRATE FERTILIZER.

B. Canola, Mustard and Flax:

It is ***not*** recommended that nitrogen be placed with the seed of canola, mustard or flax, except for the nitrogen in phosphate fertilizer (i.e. 12-51-0 to maximum 40 lbs product per acre or 16-20-0-14 to maximum 75 lbs product per acre).

These are general recommendations for Saskatchewan that should be safe under varying weather, soil and fertilizer placement conditions throughout the province.

Conditions under which higher rates of nitrogen fertilizer can be placed with the seed and be expected to cause minimal seedling damage are described below.

Factors Affecting Seedling Damage To Seed Placed Fertilizer

1. **Crop** — cereal crops are more tolerant to seed placed fertilizer than canola or mustard. Flax does not tolerate seed placed nitrogen fertilizer.

2. **Fertilizer Type** — all nitrogen fertilizers can cause seedling damage when a high fertilizer salt concentration occurs adjacent to seeds or seedlings. Fertilizers such as those that contain urea (i.e. 46-0-0, 34-17-0) produce ammonia that can cause seedling damage at lower rates of N application than fertilizer containing ammonium nitrate (i.e. 34-0-0(0), 26-13-0). As a result, lower rates of seed placed fertilizer are recommended for urea than ammonium nitrate.

   Solution fertilizers are a combination of urea and ammonium nitrate sources. They can be expected to be intermediate in seedling tolerance but research to make recommendations is limited.

3. **Seeding Implement** — There can be a large variation in the concentration of fertilizers adjacent to the seed, depending upon the equipment used for application. Greater spreading of the fertilizer material and the seed reduces the likelihood of significant seedling damage.

   The major factors that affect seedling damage with any seeding implements are:
   (a) the width between rows, and
   (b) how the fertilizer is placed in relation to the seed with the implement.

   Wider spacing between seed rows increases the concentration of fertilizer in each row. The double

disc press drill places the seed and fertilizer close together. A discer, air-seeder or hoedrill can scatter the seed and fertilizer, depending on the opener used.

Producers should check their seeding equipment under field conditions to determine where the seed and fertilizer are being placed in the soil.

4. **Soil Type** — Seedling damage is most likely to occur on sandy soils and soils low in organic matter such as Grey Wooded soils and eroded knolls. The higher the clay and organic matter content of the soil, the greater the tolerance to seed placed fertilizer, especially when urea is applied. Free lime often occuring on soils with pH over 7.5 could reduce the amount of urea that can be applied with the seed.

   On clay soils such as Regina and Sceptre heavy clay, 50 lbs N/ac as urea can be seed placed with a discer for cereal crops. Similarly on Thick Black soils such as Melfort soils up to 20 lbs N/ac as ammonium nitrate can be seed placed with canola using an implement that scatters the seed and fertilizer.

5. **Soil Moisture Conditions** — Moist soil conditions during germination and seedling development reduces the potential of seedling damage from seed placed fertilizer. The highest potential for seedling damage occurs when the soils are moist enough at seeding for the fertilizer to dissolve, then dry conditions persist during and after germination. Rainfall during this period reduces the salt concentration near the seed and reduces seedling damage.

   In general, moist soil conditions at or after seeding are more likely to occur in the Black and Grey soil zones than in Brown and Dark Brown soils.

6. **Fertilizer Physical Properties, Supply, Handling and Cost** — The physical properties of different fertilizer materials can influence their ability to be conveniently applied with the seed. High relative humidity at seeding time can result in caking of granular fertilizer in the seed box.

   Ammonium nitrate fertilizers have been more prone to caking than urea and more corrosive to application equipment.

   An increase in the demand for seed placement of ammonium nitrate fertilizers by producers could result in a limited supply. Ammonium nitrate accounted for less than 10% of fertilizer N applied in Saskatchewan in 1986-87.

   Producers often find it inconvenient to handle large volumes of nitrogen fertilizer at seeding time and the nitrogen rates required may be too high for all N to be safely applied with the seed.

   The cost per pound of actual nitrogen and cost of application should be compared for different nitrogen sources. These costs could warrant alternate fertilizer placement methods.

Expected Yield Increases From Seed Placed Fertilizer

For spring seeded crops, applying nitrogen fertilizer at or near the time of seeding results in the highest efficiency of fertilizer uptake. Application of nitrogen with the seed is one of the most efficient methods of nitrogen application, provided seedling damage is prevented.

Research work has found that the efficiency of seed placed nitrogen in relation to broadcast or banded nitrogen varies with moisture conditions. In general, the following responses occur under different moisture conditions.

1. Soil moist at seeding and dry following — seed placement of nitrogen produces yield responses equal to and sometimes higher than broadcast nitrogen. However, seed placement rates should not be exceeded or methods of application should be utilized that minimize seedling damage.

2. Soil moist at seeding with good moisture conditions following — the yield increases from seed placement of nitrogen and broadcasting or banding are similar. Available soil moisture improves the response to nitrogen and could warrant using higher rates of nitrogen than can be safely seed placed.

3. Soil dry at seeding with low precipitation during the growing season — yield increases from nitrogen application are low. If any response to nitrogen is obtained it is most likely with low rates of nitrogen applied seed placed.

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